

**WHAT IS CLAIMED IS:**

1                   1.       A process for treating a petroleum residuum to convert components of  
2       said residuum having boiling temperatures ranging from about 400°F to about 800°F prior to  
3       treatment to products having boiling points that are lower by at least about 20°F, said method  
4       comprising:

- 5                   (a)       a combining said petroleum residuum with an aqueous liquid to form  
6                               an emulsion,  
7                   (b)       exposing said emulsion to ultrasound,  
8                   (c)       recovering an organic phase from said emulsion after said exposure.

1                   2.       The process of claim 1 wherein step (a) comprises combining said  
2       petroleum residuum with said aqueous liquid at a (petroleum residuum):(aqueous liquid)  
3       volume ration of from about 8:1 to about 1:5.

1                   3.       The process of claim 1 wherein step (a) comprises combining said  
2       petroleum residuum with said aqueous liquid at a (petroleum residuum):(aqueous liquid)  
3       volume ration of from about 5:1 to about 1:1.

1                   4.       The process of claim 1 wherein step (a) comprises combining said  
2       petroleum residuum with said aqueous liquid at a (petroleum residuum):(aqueous liquid)  
3       volume ration of from about 3:1 to about 1:1.

1                   5.       The process of claim 1 wherein step (b) is performed at a frequency  
2       ranging from about 30 kHz to about 300 MHz.

1                   6.       The process of claim 1 wherein step (b) is performed at a frequency  
2       ranging from about 1 MHz to about 100 MHz.

1                   7.       The process of claim 1 wherein step (b) is performed at an exposure  
2       time of from about 8 seconds to about 150 seconds.